

Bryophytes of the Yuanyang Lake Nature Reserve and the surrounding area, Taiwan

Alfons SCHÄFER-VERWIMP¹, Gerhard WINTER² & Kuei-Yu YAO³

¹Alfons Schäfer-Verwimp, Mittlere Letten 11, D-88634 Herdwangen-Schönach, Germany
moos.alfons@kabelbw.de (corresponding author)

 <https://orcid.org/0000-0002-2720-6055>

²Gerhard Winter, Senckenberg Research Institute, Senckenberganlage 25,
D-60325 Frankfurt am Main, Germany gerhard.winter@senckenberg.de

 <https://orcid.org/0000-0001-5045-6215>

³Kuei-Yu Yao, Taiwan Biodiversity Research Institute, 1, Ming-Shen East Road, JiJi Township,
552005 Taiwan (R.O.C.) vulqthu@hotmail.com

 <https://orcid.org/0000-0002-3737-6832>

Abstract: Schäfer-Verwimp, A., Winter, G. & Yao, K.-Y. (2025): Bryophytes of the Yuanyang Lake Nature Reserve and the surrounding area, Taiwan. *Frahmia* 42:1-14*

This study presents a checklist of 194 bryophyte taxa, including 135 taxa of liverworts and 59 species of mosses, found in the Yuanyang Lake Nature Reserve. This area, located in Hsinchu County, Taiwan, is characterised by its subtropical montane cloud forest and high frequency of fog. Due to its minimal human disturbance and unique microclimatic conditions, the area supports a rich diversity of bryophytes. *Frullania linii* is new to Taiwan.

Key words: Checklist, Liverworts, Mosses, Subtropical montane cloud forest, East Asia



Fig. 1. The surrounding habitat of Yuanyang Lake

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1. Introduction - Yuanyang Lake Nature Reserve

Established in 1986, the Yuanyang Lake Nature Reserve covers 374 hectares of mountainous terrain in Hsinchu County. The elevation of the site ranges from 1,670 m (lake) to 2,420 m. The high frequency of fog throughout the year has favoured the growth of a primary Taiwan yellow cypress forest, *Chamaecyparis obtusa* var. *formosana* (Hayata) Hayata, and to the extensive growth of epiphytic bryophytes. (Chang et al. 2022).

On average, the climate station at Yuanyang Lake records 342 days of fog per year. During the winter monsoon from October to February, the fog events occur for more than 50% of the hours per month, and more than a third of these events involve heavy fog, creating a subtropical mountain cloud forest at Yuanyang Lake. (Lai et al. 2006)

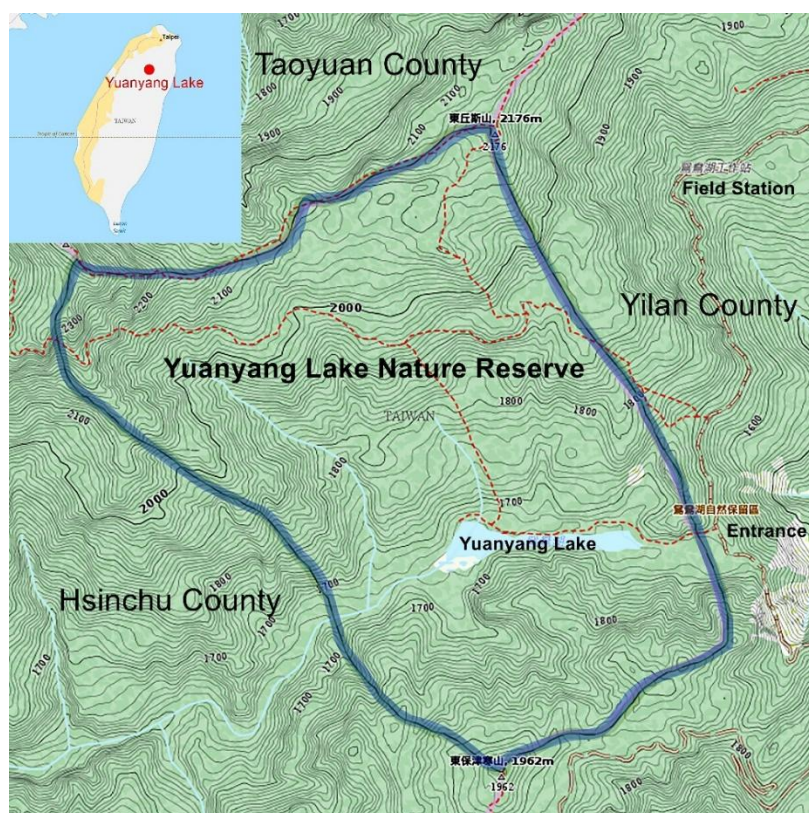


Fig. 2. Map of the Yuanyang Lake Nature Reserve
Map created using the Free and Open Source QGIS

As the lake and its surroundings are remote and difficult to access by road, there is minimal human disturbance, making the area an ideal location for research. The only access to the Yuanyang Lake Nature Reserve is via gravel road No. 100, which branches off from Highway 7 near kilometer marker 74.7.

A checkpoint has been set up at the entrance, and entry is strictly controlled; only individuals or groups with prior written permission are permitted to enter.

There is a field station operated by the Biodiversity Research Center of the Academia Sinica, established in 1998 to support sample processing and shelter researchers from harsh weather conditions.

2. Preliminary remarks

The checklist is based on Lai (1977) and Zhu & So (2001), as well as other scattered literature and our own collections made during our stay from 29 October to 1 November 2018.

The specimens of Alfons Schäfer-Verwimp (ASV) are deposited in TAIE and JE, of Gerhard Winter (GW) in TAIE and FR.

We have the privilege of including specimens housed in hb IFP collected by Gao Chien (GC) and Cao Tong (CT) in October 1998 in the Yuanyang Lake Nature Reserve. If there are multiple specimens, only one is given as reference.

In addition, we can include specimens from the Yuanyang Lake Nature Reserve housed in hb TAIM collected by Ming-Jou Lai (LAI), Ming-Jou Lai & J. E. Lewis (L&L) and Shan-Hsiung Lin (LIN). Only specimens not mentioned by Lai 1977 have been added to the list.

Records named only at the genus level are not included here.

The nomenclature follows Brinda & Atwood (2025) in "The Bryophyte Nomenclator".

* additions to the first compilation of Lai (1977) based on literature data (given in brackets)

** species reported here for the first time, based on specimens that have not yet been published

3. Checklist of Bryophytes of the Yuanyang Lake Nature Reserve

Specimens of ASV and GW were collected along a small track at the entrance of the Yuanyang Lake Nature Reserve (24°34'38" N, 121°24'43" E) on the north side of the lake.

LIVERWORTS

135 taxa, 31 taxa reported by Lai 1977, three of which have been rejected by Yamada & Lai 1979

***Acrobolbus knightii* (Mitt.) Briscoe – GC 980419, as *Marsupidium*; ASV 39227.

**Bazzania angustifolia* Horik. – (Chu 2008); LIN s.n.; ASV 39219/A.

The single collection number (8522) cited by Lai (1977) is filed under *B. ovistipula* by Yamada & Lai (1979). Hsu (2000) and Hsu & Huang (2010) listed this specimen again under *B. angustifolia*.

**Bazzania bidentula* (Steph.) P. Syd. – (Chu 2008); ASV 39241; GW 4602.

Bazzania fauriana (Steph.) S. Hatt. – (Lai 1977; Yang et al. 1994; Chen & Wu 1999; Kao et al. 2000; Wu et al. 2001; Chang et al. 2002; Chu 2008; Yang 2011); LAI 911 p.p.; ASV 39232, 39251, 39256; GW 4572.

Bazzania mayebarae S. Hatt. – The record of Lai (1977) has been rejected by Yamada & Lai (1979) who cited the collection number of Lai (8532) under *B. ovistipula*.

Bazzania ovistipula (Steph.) Abeyw. – (Lai & Wang-Yang 1976, as *B. mayebarae* and *B. pearsonii*; Lai 1977, as *B. angustifolia*, *B. mayebarae* and *B. pearsonii*; Yamada & Lai 1979; Hsu 2000, Hsu & Huang 2010, both as *B. angustifolia* and *B. ovistipula*).

- Bazzania pearsonii* Steph. – This species has been excluded from Taiwan by Yamada & Lai (1979); two collection numbers of Lai 1977 (8537, 8546) are listed under *B. ovistipula*.
- **Bazzania praeurupta* (Reinw., Blume & Nees) Trevis. – (Liu 2004; Chu 2008); LAI 8451; ASV 39215; GW 4561.
- **Bazzania sikkimensis* Schiffn. – (Yang 2011).
- **Bazzania tridens* (Reinw., Blume & Nees) Trevis. – (Liu 2004; Chu 2008; Sun 2020, as *B. oshimensis*); ASV 39280/A.
- **Bazzania vittata* (Gottsche) Trevis. – (Chu 2008; Yang 2011).
- ***Blepharostoma minus* Horik. – GC 870705.
- **Blepharostoma trichophyllum* (L.) Dumort. – (Chu 2008); ASV 39251 p.p. (admixed to *Bazzania fauriana*).
- **Calypogeia tosana* (Steph.) Steph. – (Liu 2004).
- **Cheilolejeunea chenii* R.L. Zhu & M.L. So – (Zhu et al. 1999; Zhu & So 2001; Zhu et al. 2002; Ye et al. 2013); ASV 39234/A, 39236/A.
- **Cheilolejeunea kitagawae* W. Ye & R.L. Zhu – (Yang 2009, as *Leucolejeunea paroica*); ASV 39267.
- ***Cheilolejeunea trapezia* (Nees) Kachroo & R.M. Schust. – ASV 39231/B.
- **Cheilolejeunea xanthocarpa* (Lehm. & Lindenb.) Malombe – (Chu 2008, as *Leucolejeunea*).
- ***Cololejeunea diaphana* A. Evans – ASV 39212/B p.p.
- ***Cololejeunea grossepapillosa* (Horik.) N. Kitag. – ASV 39260/B, 39271/B.
- **Cololejeunea hainanensis* R.L. Zhu – (Zhu & So 2001).
- **Cololejeunea macounii* (Spruce) A. Evans – (Zhu & So 2001); ASV 39260/D.
- **Cololejeunea magnilobula* (Horik.) S. Hatt. – (Zhu & So 2001); ASV 39271/C.
- **Cololejeunea obliqua* (Nees & Mont.) Schiffn. – (Zhu & So 2001); ASV 39212/B, 39260/E.
- **Cololejeunea ocellata* (Horik.) Benedix – (Zhu & So 2001); ASV 39260/C.
- **Cololejeunea peraffinis* (Schiffn.) Schiffn. – (Zhu & So 2001).
- **Cololejeunea sintenisii* (Steph.) Pócs – (Zhu & So 2001, as *Aphanolejeunea angustiloba*).
- **Cololejeunea subocelloides* Mizut. – (Zhu & So 2001).
- ***Cololejeunea trichomanis* (Gottsche) Besch. – ASV 39271/G, as *C. goebelii*.
- **Colura tenuicornis* (A. Evans) Steph. – (Zhu & So 2001); ASV 39278/A.
- ***Cryptolophocolea ciliolata* (Nees) L. Söderstr., Crand.-Stotl., Stotler & Vána – GC 980309, as *Chiloscyphus*.
- ***Cryptolophocolea costata* (Nees) L. Söderstr. – GC 980644, ASV 39250, both as *Chiloscyphus*.

- **Cryptolophocolea sikkimensis* (Steph.) Bakalin & Maltseva – (Wu & Gao 2008, as *Chiloscyphus*).
- ***Denotarisia linguifolia* (De Not.) Grolle – GC 980526 - the same number also for *Plicanthus hirtellus*.
- **Drepanolejeunea angustifolia* (Mitt.) Grolle – (Zhu & So 2001); ASV 39271/E.
- **Drepanolejeunea erecta* (Steph.) Mizut. – (Zhu & So 2001); ASV 39212/C, 39231/C, 39264.
- **Drepanolejeunea foliicola* Horik. – (Zhu & So 2001); ASV 39212/A, 39236/B, 39271/A.
- **Drepanolejeunea pentadactyla* (Mont.) Steph. – (Zhu & So 2001; Chu 2008); ASV 39260/A.
- **Drepanolejeunea ternatensis* (Gottsche) Schiffn. – (Zhu & So 2001; Chu 2008); ASV 39246.
- **Drepanolejeunea vesiculosa* (Mitt.) Steph. – (Chu 2008); ASV 39231/A.
- **Drepanolejeunea yunnanensis* (P.C. Chen) Grolle & R.L. Zhu – (Zhu & So 2001).
- ***Frullania densiloba* Steph. ex A. Evans – GW 4367.
- Frullania moniliata* (Reinw., Blume & Nees) Mont. – (Lai 1977, Hsu 2000, Hsu & Huang 2010, all as *F. tamarisci* subsp. *obscura*; Chu 2008); GW 4356, 4361, 4363, 4371, 4387.
- ***Frullania motoyana* Steph. – ASV 39248, 39249, 39266, 39274/B; GW 4364, 4368, 4370, 4374.
- ***Frullania serrata* Gottsche – ASV 39274/A; GW 4372.
- ***Frullania tamarisci* (L.) Dumort – CT 980335.
- **Fuscocephaloziopsis gollanii* (Steph.) Váňa & L. Söderstr. – (Chu 2008, as *Cephalozia*); ASV 39280 p.p. (a few plants admixed to *Schiffneria hyalina*).
- ***Fuscocephaloziopsis catenulata* (Huebener) Váňa & L. Söderstr. – ASV 39254 (c. per.), as *Cephalozia*.
- **Herbertus aduncus* (Dicks.) Gray – (Wu et al. 2001).
- **Herbertus dicranus* (Taylor) Trevis. – (Yang 2011); LAI 910.
- ***Herbertus herpocladoides* E.B. Scott & H.A. Mill. – CT 980608.
- Herbertus sakuraii* (Warnst.) S. Hatt. – (Lai 1977; Hsu 2000; Hsu & Huang 2010).
- **Heteroscyphus acutangulus* (Schiffn.) Schiffn. – (Gao et al. 2004).
- **Heteroscyphus argutus* (Reinw., Blume & Nees) Schiffn. – (Liu 2004).
- Heteroscyphus coalitus* (Hook.) Schiffn. – (Lai 1977, as *H. bescherellei*; Liu 2004, Teng 2006); GC 980513; ASV 39243.
- Note: The specimen Lai 8458, cited by Lai 1977 as *H. bescherellei*, is listed as *Chandonanthus hirtellus* in Hsu 2000 and Hsu & Huang 2010.
- **Heteroscyphus lophocoleoides* S. Hatt. – (Liu 2004).
- ***Heteroscyphus succulentus* (Gottsche) Schiffn. – CT 980556.

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- **Heteroscyphus tridentatus* (Sande Lac.) Grolle – (Gao et al. 2004); CT 980625.
- **Heteroscyphus turgidus* (Schiffn.) Schiffn. – (Gao et al. 2004); GC 980690; ASV 39233.
- **Isotachis japonica* Steph. – (Yang 2011).
- Jubula hutchinsiae* subsp. *javanica* (Steph.) Verd. – (Lai 1977, Hsu 2000, Hsu & Huang 2010, all as *J. javanica*); ASV 39216, GW 4376, both as *J. javanica*.
- **Kurzia abietinella* (Herzog) Grolle – (Wu & Yamada 2000).
- **Kurzia borneensis* Mizut. – (Wu & Yamada 2000).
- Kurzia makinoana* (Steph.) Grolle – (Lai 1977; Hsu 2000; Hsu & Huang 2010); ASV 39239/A.
- **Lejeunea discreta* Lindenb. – (Zhu & So 2001); ASV 39217.
- Lepicolea yakusimensis* (S. Hatt.) S. Hatt. – (Lai & Wang-Yang 1976; Lai 1977; Hsu & Huang 2010; Yang 2011); CT 980474; LAI 8541; L&L 145; ASV 39278.
- Lepidozia fauriana* Steph. – (Lai 1977; Hsu 2000; Liu 2004; Chen et al. 2006; Hsu & Huang 2010); LAI 917, 930; ASV 39239/B, 39270.
- Lepidozia subtransversa* Steph. – (Lai 1977, as *L. filamentosa* subsp. *subtransversa*).
- ***Lepidozia trichodes* (Reinw., Blume & Nees) Ness – LIN s.n.
- ***Lepidozia vitrea* Steph. – ASV 39272.
- **Leptolejeunea apiculata* (Horik.) S. Hatt. – (Zhu & So 2001); ASV 39212/E, 39271/D.
- ***Lophocolea bidentata* (L.) Dumort. – GC 980240, as "*Chiloscyphus bidentatus* (L.) Dumort."
- ***Lophocolea coadunata* (Sw.) Mont. – CT 980590, as *Chiloscyphus latifolius*.
- ***Lophocolea semiteres* (Lehm.) Mitt. – GC 980644, as *Chiloscyphus*.
- ***Lopholejeunea nigricans* (Lindenb.) Steph. ex Schiffn. – ASV 39235/B.
- ***Lopholejeunea subfusca* (Nees) Schiffn. – ASV 39235/A.
- Makinoa crispata* (Steph.) Miyake – (Lai 1977; Hsu 2000; Hsu & Huang 2010).
- Mastigophora dicladus* (Brid. ex F. Weber) Nees – (Lai 1977; Inoue 1978; Hsu 2000; Wu et al. 2001; Chang et al. 2002; Lai 2007; Hsu & Huang 2010); GC 980479; L&L 150; ASV 39258; GW 4567.
- ***Metacalypogeia alternifolia* (Nees) Grolle – CT 980568, as *Bazzania subdistans*.
- **Metzgeria furcata* (L.) Corda – (Zhu & So 2001).
- **Microlejeunea punctiformis* (Taylor) Steph. – (Zhu & So 2001, as *Lejeunea*).
- **Mnioloma fuscum* (Lehm.) R.M. Schust. – (Gao et al. 2002; He et al. 2013).
- ***Mylia taylorii* (Hook.) Gray – GC 980764.
- Mylia verrucosa* Lindb. – (Lai 1977; Hsu 2000; Hsu & Huang 2010); L&L 152; ASV 39214; GW 4560.
- ***Mylia verrucosa* subsp. *nuda* (Inoue & B.Y. Yang) Potemkin & Kazan. – LAI 927, as *M. nuda*.

- Nowellia curvifolia* (Dicks.) Mitt. – (Lai 1977; Hsu 2000; Hsu & Huang 2010); CT 980792; LIN s.n.; ASV 39253 p.p. (admixed to *Riccardia* sp.); GW 4563, 4603.
- ***Odontoschisma denudatum*** (Mart.) Dumort. – GC 980662; ASV 39228, 39263.
- Odontoschisma grosseverrucosum* Steph. – (Lai 1977; Hsu 2000; Hsu & Huang 2010); GC 980352; ASV 39244.
- Pallavicinia ambigua* (Mitt.) Steph. – (Lai 1977, as *P. longispina*; Liu 2004, as *P. subciliata*); ASV 39223, GW 4526, both as *P. subciliata*.
- ***Plagiochila fordiana*** Steph. – ASV 39279.
- Plagiochila fruticosa* Mitt. – (Lai 1977; Hsu 2000; Hsu & Huang 2010).
- **Plagiochila khasiana*** Mitt. – (Sun 2020).
- Plagiochila nepalensis* Lindenb. – (Lai 1977, as *P. gollanii*; Liu 2004); L&L 147; ASV 39230.
- **Plagiochila ovalifolia*** Mitt. – (Liu 2004; Chen et al. 2006).
- **Plagiochila peculiaris*** Schiffn. – (So 2001; Sun 2020); CT 980489; LIN s.n.; LAI 904, 925; ASV 39261.
- **Plagiochila pulcherrima*** Horik. – (Liu 2004); LIN s.n.; ASV 39240, 39259; GW 4569.
- **Plagiochila sciophilila*** Nees ex Lindenb. – (Liu 2004); ASV 39277.
- Plagiochila trabeculata* Steph. – (Lai 1977; Hsu 2000; Liu 2004; Hsu & Huang 2010).
- Pleurozia acinosa* (Mitt.) Schiffn. – (Lai 1977; Chang et al. 2002; Liu 2004; Lai 2007; Chu 2008); GC 980500; LIN s.n.; ASV 39229.
- ***Pleurozia purpurea*** Lindb. – GC 981432(b).
- Pleurozia subinflata* (Austin) Austin – (Lai 1977, Hsu 2000, Hsu & Huang 2010, all as *P. giganteoides*; Chen et al. 2006, Teng 2006, both as *Eopleurozia giganteoides*; Lai 2007); GC 980756; ASV 39225; GW 4598, 4600.
- **Plicanthus birmensis*** (Steph. ex Schiffn.) R.M. Schust. – (Teng 2006, Chu 2008, Sun 2020, all as *Chandonanthus*).
- Plicanthus hirtellus* (F. Weber) R.M. Schust. – (Lai 1977, Hsu 2000, Chu 2008, Hsu & Huang 2010, all as *Chandonanthus*); CT 980622.
- ***Porella caespitans*** (Steph.) P. Syd. – ASV 39238; GW 4565.
- ***Ptychanthus striatus*** (Lehm. & Lindenb.) Nees – GC 980384.
- **Radula acuminata*** Steph. – (Zhu & So 2001); ASV 39212/D.
- **Radula cavifolia*** Hampe ex Gottsche, Lindenb. & Nees – (Zhu & So 2001; Teng 2006); CT 980735; ASV 39224, 39246/A.
- ***Radula retroflexa*** Taylor – GC 980911a.
- ***Radula tjibodensis*** K.I. Goebel – ASV 39245.

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- ***Riccardia nagasakiensis*** (Steph.) S. Hatt. – ASV 39276.
- **Saccogynidium irregularospinum*** C. Gao, T. Cao & M.J. Lai – (Gao et al. 2001).
- **Saccogynidium muricellum*** (De Not.) Grolle – (Gao et al. 2001); GC 980484; ASV 39239/C, 39247.
- **Saccogynidium rigidulum*** (Nees) Grolle – (Gao et al. 2001); GC 980419; ASV 39220 p.p.
- **Scapania ciliata*** Sande Lac. – (Yang 2011); G&C 980616; ASV 39218.
- ***Scapania ciliatospinosa*** Horik. – GC 980486.
- ***Scapania ferruginea*** (Lehm. & Lindenb.) Lehm. & Lindenb. – GC 980718.
- ***Scapania glaucoviridis*** Horik. – LAI 8462.
- Scapania maxima*** Horik. – (Lai 1977; Hsu 2000; Hsu & Huang 2010).
- Scapania ornithopoides*** (With.) Waddell – (Lai 1977, Hsu 2000, Wu et al. 2001, Hsu & Huang 2010, all as *S. ornithopodioides*); GC 980304, LIN s.n., L&L 136, all as *S. ornithopodioides*
- **Scapania parvidens*** Steph. – (Zuo et al. 2007); CT 980340.
- **Scapania parvitexta*** Steph. – (Zuo et al. 2007); GC 980672.
- **Scapania stephanii*** Müll. Frib. – (Yang 2011); CT 980354.
- **Scapania subnimbosa*** Steph. – (Liu 2004, Yang 2011, Sun 2020, all as *S. robusta*); GC 980715; ASV 39222, 39262; GW 4568.
- **Schiffneria hyalina*** Steph. – (Liu 2004); CT 980724; ASV 39280.
- Schistochila acuminata*** Steph. – (Lai 1977, as *S. rigidula*; Inoue 1985; Wu et al. 2001; Chang et al. 2002; So 2003; Liu 2004; Gao & Wu 2004; Lai 2007); GC 980355; LIN s.n.; ASV 39219; GW 4562.
- **Schistochila aligera*** (Nees & Blume) J.B. Jack & Steph. – (Gao & Wu 2004, as *Gottschea*); ASV 39242; GW 4564.
- **Schistochila blumei*** (Nees) Trevis. – (Gao & Wu 2004); G&C 980271.
- **Schistochila minor*** C. Gao & Y.Huan Wu – (Gao & Wu 2004); ASV 39269; GW 4570.
- ***Schistochilopsis cornuta*** (Steph.) Konstant. – ASV 39220.
- Schizophyllopsis bidens*** (Reinw., Blume & Nees) Vána & L. Söderstr. – (Lai & Wang-Yang 1976, Lai 1977, Hsu 2000, Hsu & Huang 2010, all as *Anastrophyllum*); GC 980285, LAI 8528, ASV 39288/B, all as *Anastrophyllum*.
- ***Solenostoma speciosum*** (Horik.) Hentschel, K. Feldberg, Bombosch, D.G. Long, Vána & Heinrichs – GC 980641.
- ***Spruceanthus semirepandus*** (Nees) Verd. – ASV 39255.

- **Syzygiella autumnalis* (DC.) K. Feldberg, Váša, Hentschel & Heinrichs – (Zhu & So 2001, as *Jamesoniella*).
- Tetralophozia filiformis* (Steph.) Urmi – (Lai 1977, as *Chandonanthus pusillus*).
- ***Trichocolea pluma* (Reinw., Blume & Nees) Mont. – LAI 907; ASV 39257; GW 4573, 4601.
- Trichocolea tomentella* (Ehrh.) Dumort. – (Lai 1977; Liu 2004, Chen et al. 2006; Chu 2008; Yang 2011; Sun 2020); CT 980771; LAI 904, 6037.
- ***Zoopsis liukuensis* Horik. – GC 980359 (the same number also used for *Saccogynidium muricellum*, *Schiffneria hyalina* and *Nowellia curvifolia*).

MOSSES

59 species, 20 species reported by Lai 1977

- **Acroporium secundum* (Reinw. & Hornsch.) M. Fleisch. – (Yang et al. 1994, as *A. suzukii*).
- **Aerobryidium levieri* (Renauld & Cardot) S.H. Lin – (Chen et al. 2006; Teng 2006).
- Atrichum undulatum* (Hedw.) P. Beauv. – (Lai 1977).
- **Bartramia halleriana* Hedw. – (Yang et al. 1994).
- **Calohypnum oldhamii* (Mitt.) Jan Kučera & Ignatov – (Wu et al. 2021, as *Hypnum*).
- Calohypnum plumiforme* (Wilson) Jan Kučera & Ignatov – (Lai 1977, as *Hypnum* "plumaeforme").
- **Campylopus sinensis* (Müll. Hal.) J.-P. Frahm – (Yang et al. 1994, as *C. japonicus*).
- ***Campylopus umbellatus* (Arn.) Paris – GC 980715.
- ***Chionostomum rostratum* (Griff.) Müll. Hal. – CT 980673.
- ***Clastobryellina ceylonensis* (Broth.) H. Akiyama – GC 980778, as "*Clastobryum tenerrima*".
- **Dicranodontium uncinatum* (Harv.) A. Jaeger – (Yang et al. 1994, as *D. "cincinatum"*; Wu et al. 2001).
- **Dicranoloma blumei* (Nees) Broth. ex Renauld – (Wu et al. 2001; Chang et al. 2002); LIN s.n.; ASV 39275.
- ***Dicranoloma braunii* (Müll. Hal.) Paris – CT 981740, as *D. brevisetum* var. *samoanum*.
- ***Distichophyllum collenchymatosum* Cardot – LAI 6088.
- **Eurhynchiadelphus eustegia* (Besch.) Ignatov & Huttunen – (Yang et al. 1994, as *Eurhynchium*).
- ***Fauriella tenuis* (Mitt.) Card. – ASV 39250 p.p., admixed to *Chiloscyphus costatus*.
- Fissidens dubius* P. Beauv. – (Lai 1977, as *F. cristatus*).
- **Floribundaria floribunda* (Dozy & Molk.) M. Fleisch. – (Liu 2004).
- **Floribundaria pseudofloribunda* M. Fleisch. – (Liu 2004).

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- **Gollania philippinensis* (Broth.) Nog. – (Yang et al. 1994).
- **Homaliodendron flabellatum* (Sm.) M. Fleisch. – (Liu 2004, as *F. scalpellifolium*).
- **Hookeria acutifolia* Hook. & Grev. – (Liu 2004; Lai 2007); ASV 39221.
- **Hylocomium splendens* (Hedw.) Schimp. – (Liu 2004).
- Hypnodendron vitiense* Mitt. – (Lai 1977); LAI 6080.
- ***Hypopterygium hookerianum* (Griff.) A.J. Shaw, I.H. Holz, C.J. Cox & Goffinet – ASV 39234/B, as *Cyathophorella*.
- **Leucobryum bowringii* Mitt. – (Yang et al. 1994; Liu 2004).
- **Leucobryum juniperoideum* (Brid.) Müll. Hal. – (Yang et al. 1994, as *L. neilgherrense*).
- **Leucoloma molle* (Müll. Hal.) Mitt. – (Sun 2020).
- Leucobryum scabrum* Sande Lac. – (Lai 1977); LIN s.n.
- Meteoriella soluta* (Mitt.) S. Okamura – (Lai 1977; Chu 2008); ASV 39273.
- ***Myurella sibirica* (Müll. Hal.) Reimers – CT 980293 (number also used for *Heteroscyphus coalitus*).
- Pilotrichopsis dentata* (Mitt.) Besch. – (Lai 1977).
- Plagiomnium maximoviczii* (Lindb.) T.J. Kop. – (Lai 1977).
- **Pogonatum cirratum* (Sw.) Brid. subsp. *cirratum* – (Yao & Yang 2016).
- ***Pogonatum japonicum* Sull. & Lesq. – LIN s.n., as *P. grandifolium*.
- **Pogonatum neesii* (Müll. Hal.) Dozy – (Yang et al. 1994).
- **Polytrichum commune* Hedw. – (Yang et al. 1994; Yao & Yang 2016).
- ***Polytrichum densifolium* Wilson ex Mitt. – LIN s.n., as *P. formosum* var. *densifolium*.
- **Polytrichum formosum* Hedw. – (Lai 2007, Yao & Yang 2016, both as *Polytrichastrum*).
- Polytrichum swartzii* Hartm. – (Lai 1977, as *P. commune* var. *swartzii*).
- Pseudospiridentopsis horrida* (Mitt. ex Cardot) M. Fleisch. – (Lai 1977; Yang et al. 1994; Wu et al. 2001; Liu 2004); L&L 151; ASV 39213; GW 4559.
- **Pseudotaxiphyllum pohliicarpum* (Sull. & Lesq.) Z. Iwats. – (Yang et al. 1994, as *Isopterygium "textorii"*).
- **Pyrrhobryum dozyanum* (Sande Lac.) Manuel – (Lai 1978, as *Rhizogonium*); CT 980547.
- Pyrrhobryum latifolium* (Bosch & Sande Lac.) Mitt. – (Lai 1977, 1978, as *Rhizogonium badakense*; Yang et al. 1994, as *P. badakense*; Wu et al. 2001; Liu 2004; Chen et al. 2006; Lai 2007).
- ***Pyrrhobryum spiniforme* (Hedw.) Mitt. – GC 980394.
- Rhizomnium parvulum* (Mitt.) T.J. Kop. – (Lai & Wang-Yang 1976; Lai 1977; Hsu 2000; Lai 2007; Hsu & Huang 2010).

Note: The specimen Lai 8507 (Lai 1977) is listed under *R. parvulum* and *R. tuomikoskii* by Hsu & Huang 2010.

Rhizomnium tuomikoskii T.J. Kop. – (Lai 1977); LAI 6038.

Rhizomnium horikawae (Nog.) T.J. Kop. – (Lai 1977).

Rhodobryum giganteum (Schwägr.) Paris – (Lai 1977).

***Sematophyllum subhumile* (Müll. Hal.) M. Fleisch. – CT 980660, as *S. pulchellum*; LIN s.n.

**Sphagnum cuspidatum* Ehrh. ex Hoffm. – (Liu & Lai 1981; Lai 2007).

**Sphagnum cuspidatulum* Müll. Hal. – (Liu & Lai 1981; Lai 2007).

Sphagnum girgensohnii Russow – (Lai 1977; Liu & Lai 1981; Lai 2007); GC 980718.

**Sphagnum ovatum* Hampe ex Müll. Hal. – (Liu & Lai 1981; Lai 2007).

Sphagnum palustre L. – (Liu & Hsu 1973; Lai 1977; Yang et al. 1994; Chen & Wu 1999; Liu 2004; Liu & Lai 1981, Wu et al. 2001, Lai 2007, all as *S. palustre* subsp. *pseudocymbifolium*).

**Sphagnum sericeum* Müll. Hal. – (Liu & Lai 1981; Wu et al. 2001; Lai 2007).

***Sphagnum tenellum* (Brid.) Bory – GC 980682.

***Symblepharis reinwardtii* (Dozy & Molk.) Mitt. – ASV 39237.

**Thamnobryum subseriatum* (Mitt. ex Sande Lac.) B.C. Tan – (Liu 2004, as *T. sandei*).

Thuidium kanedae Sakurai – (Lai 1977).

Trachyloma indicum Mitt. – (Lai 1977, as *T. indicum* var. *latifolium*) – LIN s.n.; ASV 39252.

***Trichosteleum brachypelma* (Müll. Hal.) Broth. – ASV 39268, as *T. stigmosum*.

Ulota crispa (Hedw.) Brid. – (Lai 1977).

***Wijkia tanytricha* (Mont.) H.A. Crum – GC 980670.

4. Additional species found in the surrounding area

These species may also be found within the Yuanyang Lake Nature Reserve.

Specimens of ASV and GW were collected along the road between the field station (24°35'25" N, 121°24'42" E, elevation 1705 m) and the entrance to the Yuanyang Lake Nature Reserve.

Liverworts and Hornworts

***Acrolejeunea sandvicensis* (Gottsche) Steph. – ASV 39339.

***Chiaetocaulon dendroides* (Nees) Carl – ASV 39284.

***Dendroceros tubercularis* S. Hatt. – ASV 39351.

***Frullania hamatiloba* Steph. – GW 4392.

***Frullania kagoshimensis* Steph. – GW 4391.

- ***Frullania linii* S. Hatt. – ASV 39283; GW 4393 – Winter et al. 2025 [New to Taiwan].
- ***Frullania yuzawana* S. Hatt. – GW 4357.
- ***Heteroscyphus aselliformis* (Nees) Schiffn. – ASV 39344.
- ***Lejeunea exilis* (Reinw., Blume & Nees) Grolle – ASV 39355.
- ***Lejeunea flava* (Sw.) Nees – GW 4606.
- ***Porella perrottetiana* (Mont.) Trevis. – ASV 39357.
- ***Sandea japonica* Steph. ex Yoshin. – ASV 39290, as *Conocephalum*.
- ***Sphenolobus minutus* (Schreb.) Berggr. – ASV 39289/A.
- ***Wiesnerella denudata* (Mitt.) Steph. – ASV 39293.

Mosses

- ***Aerobryum speciosum* Dozy & Molk. – ASV 39300.
- ***Aptychella robusta* (Broth.) M. Fleisch. – ASV 39353/A.
- ***Atrichum crispulum* Schimp. ex Besch. – LIN s.n.
- ***Breutelia arundinifolia* (Duby) M. Fleisch. – ASV 39333, 39334; GW 4576, 4577.
- ***Macrothamnium submacrocarpum* (Ren. & Card.) M. Fleisch. – ASV 39304, as *M. macrocarpum*.
- ***Neodictyella flagellifera* (Cardot) Huttunen & D. Quandt – ASV 39349.
- ***Schlotheimia pungens* E.B. Bartram – ASV 39345.
- ***Scopelophila ligulata* (Spruce) Spruce – ASV 39303, 39348 (c. spor.).
- ***Trachypodopsis formosana* Nog. – ASV 39305; GW 4574.

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